



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 9  
75 Hawthorne Street  
San Francisco, CA 94105-3901

February 14, 2018

Ms. Carol Campagna  
Shell Oil Company  
20945 S. Wilmington Avenue  
Carson, California 90810-1039

**RE: Review of Technical Memorandum Sub-Slab Vapor and Outdoor Air Sampling for Property 23, Pre-Design Investigation, Soil and NAPL Operable Unit, Del Amo Superfund Site, California (Tech Memo) dated September 8, 2017**

Dear Ms. Campagna:

U.S. Environmental Protection Agency (EPA) has reviewed the *Technical Memorandum, Sub-Slab Vapor and Outdoor Air Sampling, Property 23, Pre-Design Investigation, Soil and NAPL Operable Unit, Del Amo Superfund Site* (Tech Memo) dated September 8, 2017, prepared by AECOM (2017a).

The objective of the Tech Memo was to report results of investigations completed by AECOM (on behalf of the responsible party [RP]) as part of the predesign investigation for soil-vapor extraction (SVE), based on sub-slab samples collected beneath Property 23 (the Coca-Cola Facility) and collected in outdoor air. The Tech Memo concluded that implementation of SVE beneath Property 23 is not required, and that no further action pertaining to this remedy component is necessary. EPA has the following comments:

## **Collection Methods and Sample Locations**

Five sub-slab samples were collected beneath the existing building on Property 23 on May 9, 2017, as well as two outdoor (ambient) air samples along the western side of the building to establish background conditions. A field duplicate sub-slab sample was also collected by AECOM, and the Data Validation Memorandum (AECOM, 2017b) states the precision between the sample and field duplicate was acceptable (however, relative percent difference [RPD] details were not provided, and should be added to a revised memo). Vapor Pin<sup>®</sup> technology was used to collect the sub-slab samples, while outdoor air sampling used Summa canisters.

All sub-slab samples were analyzed using EPA Method TO-15, and ambient air samples were analyzed using EPA Method TO-15 Selected Ion Monitoring.

The Tech Memo (AECOM, 2017a) briefly discusses out-of-scope high purge volume (HPV) sampling that was performed, but as the sample collection technique was suboptimal (i.e., insufficient vacuum, incomplete equipment decontamination), the HPV sample was not evaluated in the Tech Memo. Resampling using HPV sampling should be considered, especially if it could result in greater sub-slab concentrations collected using Vapor Pin<sup>®</sup>.

technology.

On May 26, 2017, two of the sub-slab locations were sampled again to allow duplicate samples to be collected by EPA for analysis by the EPA Region 9 Laboratory (Husby, 2017). Results of the two EPA duplicate samples have been received by APTIM (attached), and a comparison between the AECOM and EPA results was performed (refer to Table 1 of the Tech Memo [AECOM, 2017a]).

Split-sample data evaluation was based on guidance presented in United States Army Corps Engineers document, *Comparison Criteria for Environmental Chemical Analyses of Split Samples Sent to Different Laboratories* (1996). The data were compared by evaluating the ratio between the responsible party's laboratory results (RPL) and EPA's Region 9 laboratory result (quality assurance [QA]).

$$\text{Concentration Ratio} = \text{RPL/QA}$$

- Concentrations between the two sample sets will be considered in agreement if the ratios fall between 0.50 and 2.0.
- Concentrations between the two sample sets will be considered in disagreement if the ratios are less than 0.50 or greater than 2.0 but less than 3.0.
- Concentrations between the two sample sets will be considered in significant disagreement if the ratios are greater than 3.0.

Table 1 of the Tech Memo (AECOM, 2017a) summarizes the RP sample and split results for this sampling event. Table 1 shows all compounds detected in either AECOM's sample or EPA's split samples; however, ratios were only calculated for compounds detected by both laboratories, and if the concentrations were greater than the reporting limits. Concentration ratios were calculated for six analytes. Four were considered in agreement between RP laboratory sample concentrations and split sample concentrations. One compound, acetone, was considered in disagreement, and one was considered in serious disagreement for tetrachloroethene (PCE). Acetone is a polar, poor-performing compound, and high variability in samples with low concentrations is not unexpected. The PCE concentrations' difference (approximately 10-fold) is unexplainable. The EPA Region 9 laboratory reviewed the analytical raw data to determine if any dilution or reporting error may have occurred. No errors were detected, and RP raw data is not available for review. Although the split-sample results for PCE were not in agreement, the discrepancy would not have affected project decisions since both concentrations are well below the screening limit of 1,900 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ).

As shown in Table 1 of the Tech Memo (AECOM, 2017a), many of the volatile organic compounds (VOCs) detected in the AECOM samples, but not in EPA split samples, were due to reporting-level discrepancies between the laboratories. AECOM's laboratory (Eurofins-Calscience) achieved lower detection and reporting limits, which accounts for the higher number of compounds detected and reported in the AECOM sample results. However, both laboratories' reporting limits were well below the action levels, and the difference between the laboratories results would not affect project decisions. The relative difference between the comparable concentrations varied considerably, with the largest RPD occurring for PCE analyzed from location SGL00939. In this sample, AECOM reported a concentration of  $280 \mu\text{g}/\text{m}^3$ , while EPA reported a concentration of  $30 \mu\text{g}/\text{m}^3$ , which resulted in a RPD of

161 percent (%). Generally, a RPD greater than 50% suggests poor precision.

The concentration of PCE analyzed from location SGL00934 was greater in the EPA split sample at 2,400  $\mu\text{g}/\text{m}^3$  as compared with the sample analyzed by AECOM at 1,700  $\mu\text{g}/\text{m}^3$ . Although these split results were evaluated as analytically “in agreement,” the decision based on this data is not in agreement. The EPA reported the PCE concentration exceeds the industrial air action level/cleanup goal of 1,900  $\mu\text{g}/\text{m}^3$ , whereas AECOM results do not. An analytical result that is less than but close to a concentration threshold of concern may also have analytical variation above that threshold. Multiple analyses of the same sample might give results above or below the threshold while still meeting QA requirements. Based on the laboratory control criteria provided, analytical results for PCE may vary up to 30% to remain within the accuracy and precision quality control range. Based on a true concentration of 1,900  $\mu\text{g}/\text{m}^3$ , the analytical values can range from 1,330  $\mu\text{g}/\text{m}^3$  to 2,470  $\mu\text{g}/\text{m}^3$ , and still meet all accuracy and precision quality control criteria.

The five sub-slab samples, as shown on Figure 2 of the Tech Memo (AECOM, 2017a), appear to have generally been collected in appropriate locations as they were within the previously identified building area of concern (i.e., the southeastern corner of the building where a truck maintenance facility currently exists, and where chlorinated solvents were/are used). However, it should be noted that none of the current locations targeted former sub-slab sample SGL0925 shown on Figure 18 of the *Revised Remedial Design Work Plan for the Soil and NAPL Operable Unit, Del Amo Superfund Site, Los Angeles, California* (Remedial Design Work Plan; AECOM, 2016), which had elevated PCE and trichloroethene (TCE) concentrations of 6,500 and 3,600  $\mu\text{g}/\text{m}^3$ , respectively. The closest current samples were approximately 25 to 30 feet to the northwest, northeast, and southwest of this historical hot-spot location. It is unknown if resampling at the former sub-slab sample SGL0925 location would show greater concentrations of PCE or TCE than currently reported by AECOM (i.e., 1,700 and 310  $\mu\text{g}/\text{m}^3$ , respectively).

Although the Tech Memo (AECOM, 2017a) mentions that sub-slab leak testing prior to sample collection was completed in general accordance with the Field Sampling Plan (Appendix F of the Remedial Design Work Plan [AECOM, 2016]), no field documentation was provided. Field documentation should be included as an attachment.

It should be noted that the Data Validation Memorandum (AECOM, 2017b) appears to have a typo for the date of outdoor air-sample collection; it should be May 9, 2017, not May 19, 2017.

## Memo Tables and Figures

The following comments are presented for the information presented in Table 1 of the Tech Memo (AECOM, 2017a):

- The first column in the table indicates only detected VOCs are presented; however, several VOCs listed are shown to be all nondetect (e.g., chlorobenzene, 1,2-dibromoethane, and 1,2-dichloroethane). Corrections should be made.
- Some detected results are not bolded (e.g., ethylbenzene and 4-ethyltoluene in sample VSS01318). Corrections should be made.
- AECOM field duplicate results for VSS01310 should be added to the table.

- Footnote 2 says that the action level (for 1,2-dibromoethane) is the background concentration ( $0.091 \mu\text{g}/\text{m}^3$ ) divided by the attenuation factor, as the background concentration exceeds the 2012 air regional screening level (RSL). However, the background concentration for this compound is shown as less than 0.091 U; therefore, it is unclear why it is assumed it exceeds the RSL of  $0.02 \mu\text{g}/\text{m}^3$ . Please revise as needed.

The following comments are presented for the information presented on Figure 2 the Tech Memo (AECOM, 2017a):

- The legend has sub-slab and outdoor air VOC concentrations listed as micrograms per kilogram; the unit of measure should be  $\mu\text{g}/\text{m}^3$ .
- The historical sub-slab hot-spot location (SGL0925; see Section 2.1) should be added to the figure.

## Cleanup levels

The action levels/cleanup goals presented in Table 1 of the Tech Memo (AECOM, 2017a) are correct, and match the values presented in the Record of Decision (ROD; EPA, 2013) or calculated using industrial air RSLs (EPA, 2012) divided by the attenuation factor of 0.0011, and rounded to 1 or 2 significant figures.

It is important to note that Section 12.2 of the ROD (EPA, 2013) states the following:

*This action level can be adjusted to incorporate other VOC constituents besides these, if found during additional remedial design sampling to exceed the risk levels and require action where the above had not require action. In such cases, the action level for all VOC contaminants combined would be a cumulative risk of one in one million excess cancer risk or hazard index greater than 1 for an industrial/commercial use exposure scenario.*

Based on this ROD information, Table 1 (AECOM, 2017a) should be revised to estimate the cumulative cancer risks and cumulative non-cancer hazards for the detected VOCs in order to conservatively assume exposure to more than just one VOC at a time.

An uncertainty section should be added to the Tech Memo to evaluate non-detect VOC detection limits, where detection limits are compared with action levels/cleanup goals.

## Conclusions

The previously discussed issues in Section 2 should be addressed in revised AECOM Tech Memos (2017a, 2017b).

None of the current locations targeted former sub-slab sample SGL0925 shown on Figure 18 of the Remedial Design Work Plan (AECOM, 2016), which had elevated PCE and TCE concentrations. The closest current samples were approximately 25 to 30 feet to the northwest, northeast, and southwest of this historical hot-spot location. The source of this elevated PCE and TCE is unknown and this historical hot-spot location was not resampled. The extent of elevated PCE and TCE sub-slab vapor needs to be better defined about sample location SGL0925.

One of the analyte results (PCE analyzed from location SGL00934 collected on May 26, 2017) was greater in the sample analyzed by EPA (2,400 µg/m<sup>3</sup>) as compared with the sample analyzed by AECOM (1,700 µg/m<sup>3</sup>; Section 2.1). A concentration of 2,400 µg/m<sup>3</sup> exceeds the industrial air action level/cleanup goal of 1,900 µg/m<sup>3</sup> for PCE. Therefore, the AECOM conclusion that implementation of SVE beneath Property 23 is not required, and that no further action pertaining to this remedy component is necessary, is incorrect. This location should be resampled to provide a third data point from which conclusions can be made.

Regards,



Anhtu Nguyen  
Project Manager  
California Site Cleanup Section I, Superfund Division

cc: Pat Gobb, Newfields  
Julie Doane-Allmon, AECOM  
Lora Battaglia, CB&I

# ATTACHMENT

Region 9 Laboratory Results



**United States Environmental Protection Agency  
Region 9 Laboratory**

1337 S. 46th Street Building 201  
Richmond, CA 94804

**Date:** 6/16/2017

**Subject:** Analytical Testing Results - Project R17S11  
SDG: 17150A

**From:** Peter Husby, Director  
EPA Region 9 Laboratory  
EMD-3-1

**To:** Anhthu Nguyen  
California Site Cleanup Section 2  
SFD-7-2

Attached are the results from the analysis of samples from the **Del Amo FY17 Remedial Design Investigation** project. These data have been reviewed in accordance with EPA Region 9 Laboratory policy.

A full documentation package for these data, including raw data and sample custody documentation, is on file at the EPA Region 9 Laboratory. If you would like to request additional review and/or validation of the data, please contact Eugenia McNaughton at the Region 9 Quality Assurance Office.

If you have any questions, please ask for Richard Bauer, the Lab Project Manager at (510)412-2300.

Electronic CC: Lora Battaglia, C.B. & I., Inc.  
Rose Condit, C.B. & I., Inc.

**Analyses included in this report:**

Volatile Organic Compounds by GC/MS



United States Environmental Protection Agency  
**Region 9 Laboratory**

1337 S. 46th Street, Building 201, Richmond, CA 94804  
Phone:(510) 412-2300 Fax:(510) 412-2302

**Project Manager:** Anhtu Nguyen

**Project Number:** R17S11

**Project:** Del Amo FY17 Remedial Design  
Investigation

**California Site Cleanup Section 2**

**75 Hawthorne Street  
San Francisco CA, 94105**

**SDG:** 17150A

**Reported:** 06/16/17 10:18

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Collected	Date Received
VSS01317	1705074-01	Air	05/26/17 09:30	05/30/17 09:10
VSS01318	1705074-02	Air	05/26/17 10:20	05/30/17 09:10





# United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804  
Phone:(510) 412-2300 Fax:(510) 412-2302

**Project Manager:** Anhthu Nguyen

**Project Number:** R17S11

**Project:** Del Amo FY17 Remedial Design  
Investigation

**California Site Cleanup Section 2**

**75 Hawthorne Street**

**San Francisco CA, 94105**

**SDG:** 17150A

**Reported:** 06/16/17 10:18

## Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed	Method
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**Lab ID:** 1705074-01

**Air - Sampled: 05/26/17 09:30**

**Sample ID:** VSS01317

**Volatile Organic Compounds by TO-15**

Propene		ND	U	4	ug/m <sup>3</sup> Air	B17E173	05/30/17	06/01/17	TO-15
Dichlorodifluoromethane		ND	U	10	"	"	"	"	TO-15
1,2-Dichlorotetrafluoroethane		ND	U	10	"	"	"	"	TO-15
Chloromethane		ND	U	4	"	"	"	"	TO-15
Vinyl chloride		ND	U	5	"	"	"	"	TO-15
1,3-Butadiene		ND	U	5	"	"	"	"	TO-15
Bromomethane		ND	U	8	"	"	"	"	TO-15
Chloroethane		ND	U	6	"	"	"	"	TO-15
Bromoethene		ND	U	9	"	"	"	"	TO-15
Trichlorofluoromethane		ND	U	10	"	"	"	"	TO-15
1,2,3-Trichloropropane		ND	U	10	"	"	"	"	TO-15
1,1,2-Trichloro-1,2,2-trifluoroethane		ND	U	20	"	"	"	"	TO-15
1,1-Dichloroethene		ND	U	8	"	"	"	"	TO-15
Acetone		20		5	"	"	"	"	TO-15
Carbon disulfide		ND	U	7	"	"	"	"	TO-15
2-Propanol		ND	U	5	"	"	"	"	TO-15
Allyl chloride		ND	U	7	"	"	"	"	TO-15
Dichloromethane		ND	U	7	"	"	"	"	TO-15
tert-Butyl methyl ether (MTBE)		ND	C3, J, U	8	"	"	"	"	TO-15
trans-1,2-Dichloroethene		ND	U	8	"	"	"	"	TO-15
Hexane		ND	U	8	"	"	"	"	TO-15
1,1-Dichloroethane		ND	U	9	"	"	"	"	TO-15
Vinyl acetate		ND	U	8	"	"	"	"	TO-15
cis-1,2-Dichloroethene		ND	U	8	"	"	"	"	TO-15
2-Butanone (MEK)		ND	U	6	"	"	"	"	TO-15
Ethyl acetate		ND	U	8	"	"	"	"	TO-15
Tetrahydrofuran		ND	U	6	"	"	"	"	TO-15
Chloroform		ND	U	10	"	"	"	"	TO-15
Cyclohexane		ND	U	7	"	"	"	"	TO-15
1,1,1-Trichloroethane		ND	U	10	"	"	"	"	TO-15
Carbon tetrachloride		ND	U	10	"	"	"	"	TO-15
Benzene		ND	U	7	"	"	"	"	TO-15
2,2,4-Trimethylpentane		ND	U	10	"	"	"	"	TO-15
1,2-Dichloroethane		ND	U	9	"	"	"	"	TO-15
Heptane		ND	U	9	"	"	"	"	TO-15
Trichloroethene		ND	U	10	"	"	"	"	TO-15



# United States Environmental Protection Agency Region 9 Laboratory

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## Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed	Method
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**Lab ID:** 1705074-01

**Air - Sampled: 05/26/17 09:30**

**Sample ID:** VSS01317

**Volatile Organic Compounds by TO-15**

1,2-Dichloropropane		ND	U	10	ug/m <sup>3</sup> Air	B17E173	05/30/17	06/01/17	TO-15
1,4-Dioxane		ND	U	8	"	"	"	"	TO-15
Bromodichloromethane		ND	U	10	"	"	"	"	TO-15
cis-1,3-Dichloropropene		ND	U	10	"	"	"	"	TO-15
4-Methyl-2-pentanone (MIBK)		ND	U	9	"	"	"	"	TO-15
Toluene		ND	U	8	"	"	"	"	TO-15
trans-1,3-Dichloropropene		ND	U	10	"	"	"	"	TO-15
1,1,2-Trichloroethane		ND	U	10	"	"	"	"	TO-15
Tetrachloroethene		30		10	"	"	"	"	TO-15
2-Hexanone		ND	U	9	"	"	"	"	TO-15
Chlorodibromomethane		ND	U	20	"	"	"	"	TO-15
1,2-Dibromoethane (EDB)		ND	U	20	"	"	"	"	TO-15
Chlorobenzene		ND	U	10	"	"	"	"	TO-15
Ethylbenzene		ND	U	9	"	"	"	"	TO-15
m&p-Xylene		ND	U	20	"	"	"	"	TO-15
o-Xylene		ND	U	9	"	"	"	"	TO-15
Styrene		ND	U	9	"	"	"	"	TO-15
Bromoform		ND	Q2, J, U	20	"	"	"	"	TO-15
1,1,2,2-Tetrachloroethane		ND	U	10	"	"	"	"	TO-15
4-Ethyltoluene		ND	Q2, J, U	10	"	"	"	"	TO-15
1,3,5-Trimethylbenzene		ND	U	10	"	"	"	"	TO-15
1,2,4-Trimethylbenzene		ND	U	10	"	"	"	"	TO-15
1,3-Dichlorobenzene		ND	U	10	"	"	"	"	TO-15
1,4-Dichlorobenzene		ND	U	10	"	"	"	"	TO-15
Benzyl chloride		ND	C3, J, Q3, Q2, U	10	"	"	"	"	TO-15
1,2-Dichlorobenzene		ND	U	10	"	"	"	"	TO-15
1,2,4-Trichlorobenzene		ND	C4, J, U	20	"	"	"	"	TO-15
Hexachlorobutadiene		ND	U	20	"	"	"	"	TO-15



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## Sample Results

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed	Method
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**Lab ID:** 1705074-02

**Air - Sampled: 05/26/17 10:20**

**Sample ID:** VSS01318

**Volatile Organic Compounds by TO-15**

Propene		ND	U	4	ug/m <sup>3</sup> Air	B17E173	05/30/17	06/01/17	TO-15
Dichlorodifluoromethane		ND	U	10	"	"	"	"	TO-15
1,2-Dichlorotetrafluoroethane		ND	U	20	"	"	"	"	TO-15
Chloromethane		ND	U	5	"	"	"	"	TO-15
Vinyl chloride		ND	U	6	"	"	"	"	TO-15
1,3-Butadiene		ND	U	5	"	"	"	"	TO-15
Bromomethane		ND	U	9	"	"	"	"	TO-15
Chloroethane		ND	U	6	"	"	"	"	TO-15
Bromoethene		ND	U	10	"	"	"	"	TO-15
Trichlorofluoromethane		ND	U	10	"	"	"	"	TO-15
1,2,3-Trichloropropane		ND	U	10	"	"	"	"	TO-15
1,1,2-Trichloro-1,2,2-trifluoroethane		ND	U	20	"	"	"	"	TO-15
1,1-Dichloroethene		ND	U	9	"	"	"	"	TO-15
Acetone		20		5	"	"	"	"	TO-15
Carbon disulfide		ND	U	7	"	"	"	"	TO-15
2-Propanol		3	C1, J	5	"	"	"	"	TO-15
Allyl chloride		ND	U	7	"	"	"	"	TO-15
Dichloromethane		ND	U	8	"	"	"	"	TO-15
tert-Butyl methyl ether (MTBE)		ND	C3, J, U	8	"	"	"	"	TO-15
trans-1,2-Dichloroethene		ND	U	9	"	"	"	"	TO-15
Hexane		ND	U	8	"	"	"	"	TO-15
1,1-Dichloroethane		ND	U	9	"	"	"	"	TO-15
Vinyl acetate		ND	U	8	"	"	"	"	TO-15
cis-1,2-Dichloroethene		ND	U	9	"	"	"	"	TO-15
2-Butanone (MEK)		ND	U	7	"	"	"	"	TO-15
Ethyl acetate		ND	U	8	"	"	"	"	TO-15
Tetrahydrofuran		ND	U	7	"	"	"	"	TO-15
Chloroform		10		10	"	"	"	"	TO-15
Cyclohexane		ND	U	8	"	"	"	"	TO-15
1,1,1-Trichloroethane		ND	U	10	"	"	"	"	TO-15
Carbon tetrachloride		ND	U	10	"	"	"	"	TO-15
Benzene		ND	U	7	"	"	"	"	TO-15
2,2,4-Trimethylpentane		ND	U	10	"	"	"	"	TO-15
1,2-Dichloroethane		ND	U	9	"	"	"	"	TO-15
Heptane		ND	U	9	"	"	"	"	TO-15
Trichloroethene	RE1	300		100	"	"	"	05/31/17	TO-15
1,2-Dichloropropane		ND	U	10	"	"	"	06/01/17	TO-15



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**Sample Results**

Analyte	Reanalysis / Extract	Result	Qualifiers / Comments	Quantitation Limit	Units	Batch	Prepared	Analyzed	Method
<b>Lab ID: 1705074-02</b>		<b>Air - Sampled: 05/26/17 10:20</b>							
<b>Sample ID: VSS01318</b>		<b>Volatile Organic Compounds by TO-15</b>							
1,4-Dioxane		ND	U	8	ug/m <sup>3</sup> Air	B17E173	05/30/17	06/01/17	TO-15
Bromodichloromethane		ND	U	10	"	"	"	"	TO-15
cis-1,3-Dichloropropene		ND	U	10	"	"	"	"	TO-15
4-Methyl-2-pentanone (MIBK)		ND	U	9	"	"	"	"	TO-15
Toluene		8	C1	8	"	"	"	"	TO-15
trans-1,3-Dichloropropene		ND	U	10	"	"	"	"	TO-15
1,1,2-Trichloroethane		ND	U	10	"	"	"	"	TO-15
Tetrachloroethene	RE1	2,400		200	"	"	"	05/31/17	TO-15
2-Hexanone		ND	U	9	"	"	"	06/01/17	TO-15
Chlorodibromomethane		ND	U	20	"	"	"	"	TO-15
1,2-Dibromoethane (EDB)		ND	U	20	"	"	"	"	TO-15
Chlorobenzene		ND	U	10	"	"	"	"	TO-15
Ethylbenzene		ND	U	10	"	"	"	"	TO-15
m&p-Xylene		10	C1, J	20	"	"	"	"	TO-15
o-Xylene		ND	U	10	"	"	"	"	TO-15
Styrene		ND	U	9	"	"	"	"	TO-15
Bromoform		ND	J, Q2, U	20	"	"	"	"	TO-15
1,1,2,2-Tetrachloroethane		ND	U	20	"	"	"	"	TO-15
4-Ethyltoluene		ND	J, Q2, U	10	"	"	"	"	TO-15
1,3,5-Trimethylbenzene		ND	U	10	"	"	"	"	TO-15
1,2,4-Trimethylbenzene		6	C1, J	10	"	"	"	"	TO-15
1,3-Dichlorobenzene		ND	U	10	"	"	"	"	TO-15
1,4-Dichlorobenzene		ND	U	10	"	"	"	"	TO-15
Benzyl chloride		ND	C3, J, Q2, Q3, U	10	"	"	"	"	TO-15
1,2-Dichlorobenzene		ND	U	10	"	"	"	"	TO-15
1,2,4-Trichlorobenzene		ND	C4, J, U	20	"	"	"	"	TO-15
Hexachlorobutadiene		ND	U	20	"	"	"	"	TO-15



United States Environmental Protection Agency  
**Region 9 Laboratory**

1337 S. 46th Street, Building 201, Richmond, CA 94804  
Phone:(510) 412-2300 Fax:(510) 412-2302

**Project Manager:** Anhthu Nguyen

**Project Number:** R17S11

**Project:** Del Amo FY17 Remedial Design  
Investigation

**California Site Cleanup Section 2**

**75 Hawthorne Street  
San Francisco CA, 94105**

**SDG:** 17150A

**Reported:** 06/16/17 10:18

**Quality Control**

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch B17E173 - Air\_Can\_Pressure - VOCs, Soil Gas**

**Prepared & Analyzed: 05/31/17**

**Volatile Organic Compounds by TO-15 - Quality Control**

**Blank (B17E173-BLK1)**

Propene	ND	U		2 ug/m <sup>3</sup> Air
Dichlorodifluoromethane	ND	U		5 "
1,2-Dichlorotetrafluoroethane	ND	U		7 "
Chloromethane	ND	U		2 "
Vinyl chloride	ND	U		3 "
1,3-Butadiene	ND	U		2 "
Bromomethane	ND	U		4 "
Chloroethane	ND	U		3 "
Bromoethene	ND	U		4 "
Trichlorofluoromethane	ND	U		6 "
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	U		8 "
1,1-Dichloroethene	ND	U		4 "
Acetone	ND	U		2 "
Carbon disulfide	ND	U		3 "
2-Propanol	ND	U		2 "
Allyl chloride	ND	U		3 "
Dichloromethane	ND	U		3 "
tert-Butyl methyl ether (MTBE)	ND	C3, J, U		4 "
trans-1,2-Dichloroethene	ND	U		4 "
Hexane	ND	U		4 "
1,1-Dichloroethane	ND	U		4 "
Vinyl acetate	ND	U		4 "
cis-1,2-Dichloroethene	ND	U		4 "
2-Butanone (MEK)	ND	U		3 "
Ethyl acetate	ND	U		4 "
Tetrahydrofuran	ND	U		3 "
Chloroform	ND	U		5 "
Cyclohexane	ND	U		3 "
1,1,1-Trichloroethane	ND	U		5 "
Carbon tetrachloride	ND	U		6 "
Benzene	ND	U		3 "
2,2,4-Trimethylpentane	ND	U		5 "
1,2-Dichloroethane	ND	U		4 "
Heptane	ND	U		4 "
Trichloroethene	ND	U		5 "
1,2-Dichloropropane	ND	U		5 "
1,4-Dioxane	ND	U		4 "
Bromodichloromethane	ND	U		7 "
cis-1,3-Dichloropropene	ND	U		5 "
4-Methyl-2-pentanone (MIBK)	ND	U		4 "
Toluene	ND	U		4 "



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Fax:(510) 412-2302

**Project Manager:** Anhtu Nguyen

**Project Number:** R17S11

**Project:** Del Amo FY17 Remedial Design  
Investigation

**California Site Cleanup Section 2**

**75 Hawthorne Street**

**San Francisco CA, 94105**

**SDG:** 17150A

**Reported:** 06/16/17 10:18

**Quality Control**

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch B17E173 - Air\_Can\_Pressure - VOCs, Soil Gas**

**Prepared & Analyzed: 05/31/17**

**Volatile Organic Compounds by TO-15 - Quality Control**

**Blank (B17E173-BLK1)**

trans-1,3-Dichloropropene	ND	U	5	"						
1,1,2-Trichloroethane	ND	U	5	"						
Tetrachloroethene	ND	U	7	"						
2-Hexanone	ND	U	4	"						
Chlorodibromomethane	ND	U	9	"						
1,2-Dibromoethane (EDB)	ND	U	8	"						
Chlorobenzene	ND	U	5	"						
Ethylbenzene	ND	U	4	"						
m&p-Xylene	ND	U	9	"						
o-Xylene	ND	U	4	"						
Styrene	ND	U	4	"						
Bromoform	ND	J, Q2, U	10	"						
1,1,2,2-Tetrachloroethane	ND	U	7	"						
4-Ethyltoluene	ND	J, Q2, U	5	"						
1,3,5-Trimethylbenzene	ND	U	5	"						
1,2,4-Trimethylbenzene	ND	U	5	"						
1,3-Dichlorobenzene	ND	U	6	"						
1,4-Dichlorobenzene	ND	U	6	"						
Benzyl chloride	ND	C3, J, Q2, Q3, U	5	"						
1,2-Dichlorobenzene	ND	U	6	"						
1,2,4-Trichlorobenzene	ND	C4, J, U	7	"						
Hexachlorobutadiene	ND	U	10	"						

**LCS (B17E173-BS1)**

Propene	18		2	ug/m <sup>3</sup>	18.9		95	72-121		
				Air						
Dichlorodifluoromethane	46		5	"	52.4		87	68-129		
1,2-Dichlorotetrafluoroethane	61		7	"	70.5		86	67-127		
Chloromethane	20		2	"	22.7		88	70-123		
Vinyl chloride	25		3	"	27.3		93	69-125		
1,3-Butadiene	22		2	"	23.4		96	75-121		
Bromomethane	34		4	"	41.5		83	66-125		
Chloroethane	24		3	"	27.7		87	67-125		
Bromoethene	40		4	"	47.2		85	68-124		
Trichlorofluoromethane	47		6	"	56.1		84	68-133		
1,1,2-Trichloro-1,2,2-trifluoroethane	59		8	"	72.0		81	64-125		
1,1-Dichloroethene	35		4	"	40.8		86	73-128		
Acetone	25		2	"	26.1		97	67-141		
Carbon disulfide	28		3	"	33.0		86	45-158		
2-Propanol	28		2	"	27.0		105	72-132		
Allyl chloride	32		3	"	34.4		94	75-132		
Dichloromethane	27		3	"	33.7		82	73-116		
tert-Butyl methyl ether (MTBE)	45		4	"	38.9		116	74-131		



# United States Environmental Protection Agency Region 9 Laboratory

1337 S. 46th Street, Building 201, Richmond, CA 94804

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**Project Manager:** Anhthu Nguyen

**Project Number:** R17S11

**Project:** Del Amo FY17 Remedial Design  
Investigation

**California Site Cleanup Section 2**

**75 Hawthorne Street**

**San Francisco CA, 94105**

**SDG:** 17150A

**Reported:** 06/16/17 10:18

## Quality Control

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch B17E173 - Air\_Can\_Pressure - VOCs, Soil Gas**

**Prepared & Analyzed: 05/31/17**

**Volatile Organic Compounds by TO-15 - Quality Control**

### LCS (B17E173-BS1)

trans-1,2-Dichloroethene	39			4	"	43.6	88	80-123		
Hexane	34			4	"	37.0	91	75-124		
1,1-Dichloroethane	35			4	"	40.0	87	72-125		
Vinyl acetate	45			4	"	38.7	116	31-171		
cis-1,2-Dichloroethene	35			4	"	41.2	86	77-129		
2-Butanone (MEK)	28			3	"	31.8	89	69-137		
Ethyl acetate	38			4	"	39.2	98	75-127		
Tetrahydrofuran	28			3	"	30.9	92	78-120		
Chloroform	44			5	"	52.2	85	77-126		
Cyclohexane	33			3	"	36.8	91	76-124		
1,1,1-Trichloroethane	54			5	"	56.2	96	74-133		
Carbon tetrachloride	62			6	"	65.4	95	71-141		
Benzene	31			3	"	34.2	92	81-125		
2,2,4-Trimethylpentane	49			5	"	49.5	99	82-125		
1,2-Dichloroethane	40			4	"	42.1	95	61-153		
Heptane	43			4	"	43.8	99	80-129		
Trichloroethene	52			5	"	59.1	89	73-128		
1,2-Dichloropropane	47			5	"	49.4	94	77-129		
1,4-Dioxane	38			4	"	38.2	100	58-140		
Bromodichloromethane	65			7	"	69.6	94	76-137		
cis-1,3-Dichloropropene	49			5	"	47.2	104	80-136		
4-Methyl-2-pentanone (MIBK)	44			4	"	43.4	101	65-140		
Toluene	37			4	"	40.7	91	78-133		
trans-1,3-Dichloropropene	50			5	"	44.0	114	79-146		
1,1,2-Trichloroethane	54			5	"	59.4	91	74-134		
Tetrachloroethene	65			7	"	73.2	89	73-130		
2-Hexanone	41			4	"	43.0	96	50-162		
Chlorodibromomethane	77			9	"	91.1	85	81-135		
1,2-Dibromoethane (EDB)	76			8	"	84.4	90	78-133		
Chlorobenzene	45			5	"	50.6	90	81-126		
Ethylbenzene	43			4	"	47.3	91	82-130		
m&p-Xylene	86			9	"	93.7	92	82-131		
o-Xylene	42			4	"	46.0	91	82-132		
Styrene	38			4	"	43.8	86	65-141		
Bromoform	79			10	"	111	71	84-137		
1,1,2,2-Tetrachloroethane	66			7	"	72.0	91	73-127		
4-Ethyltoluene	33			5	"	51.1	64	81-127		
1,3,5-Trimethylbenzene	47			5	"	52.6	89	77-132		
1,2,4-Trimethylbenzene	46			5	"	52.1	88	78-131		
1,3-Dichlorobenzene	55			6	"	63.1	87	79-124		
1,4-Dichlorobenzene	55			6	"	63.7	87	75-127		
Benzyl chloride	33			5	"	56.9	59	67-156		



United States Environmental Protection Agency  
**Region 9 Laboratory**

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**Project Manager:** Anhthu Nguyen

**Project Number:** R17S11

**Project:** Del Amo FY17 Remedial Design  
Investigation

**California Site Cleanup Section 2**

**75 Hawthorne Street**

**San Francisco CA, 94105**

**SDG:** 17150A

**Reported:** 06/16/17 10:18

### Quality Control

Analyte	Result	Qualifiers / Comments	Quantitation Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
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**Batch B17E173 - Air\_Can\_Pressure - VOCs, Soil Gas**

**Prepared & Analyzed: 05/31/17**

**Volatile Organic Compounds by TO-15 - Quality Control**

**LCS (B17E173-BS1)**

1,2-Dichlorobenzene	53		6	"	62.5		85	77-124
1,2,4-Trichlorobenzene	53		7	"	69.7		76	55-132
Hexachlorobutadiene	87		10	"	105		82	52-131

**LCS (B17E173-BS2)**

1,2,3-Trichloropropane	56		6	ug/m <sup>3</sup> Air	60.2		93	61-147
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**SDG:** 17150A

**Reported:** 06/16/17 10:18

**Qualifiers and Comments**

- Q3 The quantitation limit standard did not meet recovery criteria for this analyte.
- Q2 The laboratory control standard associated with this sample did not meet recovery criteria for this analyte (see LCS results for this batch in QC summary).
- J The reported result for this analyte should be considered an estimated value.
- C4 The calibration verification check did not meet % difference criteria for this analyte.
- C3 The initial calibration for this analyte did not meet calibration criteria.
- C1 The reported concentration for this analyte is below the quantitation limit.

U Not Detected

NR Not Reported

RE1, RE2, etc: Result is from a sample re-analysis.

## WORK ORDER

Printed: 5/30/2017 9:38:42AM

1705074

## EPA Region 9 Laboratory

Client: California Site Cleanup Section 2  
Project: Del Amo FY17 Remedial Design Investigation

Project Number: R17S11

Report To:

Anhtu Nguyen  
California Site Cleanup Section 2

Project Contact

Rose Condit  
CB&I Federal Services

<u>Shipping</u>		<u>Temp</u>		<u>Custody</u>		<u>Containers</u>		<u>Labels</u>		<u>Received</u>		<u>Comments</u>
<u>Containers</u>	<u>Description</u>	<u>C</u>	<u>Seals?</u>	<u>Intact?</u>	<u>Intact?</u>	<u>Intact?</u>	<u>Intact?</u>	<u>COC</u>	<u>Agree?</u>	<u>on Ice?</u>	<u>on Ice?</u>	
Box	Cooler	22	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	

Date Due: 06/20/17 (21 day TAT)

SDG: 17150A

Received By: Lorraine Avalos

Date Received: 05/30/17 09:10

Logged In By: Lorraine Avalos

Date Logged In: 05/30/17 09:25

AnalysisComments

1705074-01 VSS01317 [Air] Sampled 05/26/17 09:30 (GMT-08:00) Pacific Time  
(US &  
VOCs, Soil Gas

7247

1705074-02 VSS01318 [Air] Sampled 05/26/17 10:20 (GMT-08:00) Pacific Time  
(US &  
VOCs, Soil Gas

1588E

**WORK ORDER**

**Printed: 5/30/2017 9:38:42AM**

**1705074**

**EPA Region 9 Laboratory**

**Client: California Site Cleanup Section 2**  
**Project: Del Amo FY17 Remedial Design Investigation**

**Project Number: R17S11**

## WORK ORDER

Printed: 5/31/2017 9:12:43AM

1705074

## EPA Region 9 Laboratory

Client: California Site Cleanup Section 2  
Project: Del Amo FY17 Remedial Design Investigation

Project Number: R17S11

Report To:

Anhtu Nguyen  
California Site Cleanup Section 2

Project Contact

Rose Condit  
CB&I Federal Services

<u>Shipping</u>		<u>Temp</u>		<u>Custody</u>		<u>Containers</u>		<u>Labels</u>		<u>Received</u>		<u>Comments</u>
<u>Containers</u>	<u>Description</u>	<u>C</u>	<u>Seals?</u>	<u>Intact?</u>	<u>Intact?</u>	<u>Intact?</u>	<u>Intact?</u>	<u>COC</u>	<u>Agree?</u>	<u>on Ice?</u>	<u>on Ice?</u>	
Box	Cooler	22	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	

Date Due: 06/20/17 (21 day TAT)

SDG: 17150A

Received By: Lorraine Avalos

Date Received: 05/30/17 09:10

Logged In By: Lorraine Avalos

Date Logged In: 05/30/17 09:25

AnalysisComments

1705074-01 VSS01317 [Air] Sampled 05/26/17 09:30 (GMT-08:00) Pacific Time  
(US &  
VOCs, Soil Gas

Can 7247

1705074-02 VSS01318 [Air] Sampled 05/26/17 10:20 (GMT-08:00) Pacific Time  
(US &  
VOCs, Soil Gas

Can 1588E



**Del Amo R9-007**

COCs

Company Name: CB&I  
Project Manager: Lora Battaglia  
Phone/Fax Number: 619-533-7302  
Send Report To: Rose Condit  
Phone/Fax Number: 925-288-2151  
Address: 4005 Port Chicago Highway, Suite 200  
City: Concord, CA 94520  
Project Contact: Rose Condit  
(Email) rose.condit@cbifederalservices.com

Page 2 of 3 1705074 WKO 05 31 17 091238.PDF

## Sample Receipt Checklist

Project No: R17511 Work Order No(s): 1705074 Date: 05/29/17 by h

### CUSTODY SEALS Intact

Check if applies: ☐ External Seals ☐ Internal Seals ☐ Hand Delivered

☐ Yes ☐ No ☒ N/A- None

### TEMPERATURE 22 °C Within Acceptable Range

Check if applies:

☐ Provided Temp Blank ☐ Between 6°C to 10°C ☐ Still cooling (sampled today & iced)  
☐ Previously Frozen ☐ Insufficient/Melted Ice ☐ Delivery Delay

☐ Yes ☐ No ☒ Ambient OK

### SAMPLE CONTAINERS Intact

If not intact, was volume recoverable for analysis?

Check if applies: ☐ Bottle/Jar/Vial broken ☐ Cap broken or loose ☐ Other \_\_\_\_\_

☒ Yes ☐ No  
☐ Yes ☐ No ☒ N/A

### CHAIN OF CUSTODY Received

COC complete and consistent with labels

Check if applies: ☐ Not relinquished ☐ Inconsistency resolved ☐ Follow-up needed (see comments)

TAT and analyses match scheduling

Check if applies: ☐ Preliminary Results ☐ Rush Request ☐ 7-day TAT

Within hold times ☐ Expires today

All shipping and sample containers accounted for

☒ Yes ☐ No  
☒ Yes ☐ No ☐ N/A  
☒ Yes ☐ No ☐ N/A  
☐ Yes ☐ No ☒ N/A  
☐ Yes ☐ No ☒ N/A

### PRESERVATION / FILTRATION

Check if applies: ☐ Sample Receiving to preserve  
☐ Analyst to filter and/or preserve

Preserved and/or filtered samples correctly identified

Preserved samples (non-VOA vials) measured at correct pH

Preservation/measured pH \_\_\_\_\_

☒ N/A No chem. pres./filtra.

☐ Yes ☐ No ☒ N/A  
☐ Yes ☐ No ☒ N/A

### Sample Receiving Preservation and/or pH Adjustments\*

Sample ID	Initial pH	Pres.	Date/time Pres. added	Adjusted pH	pH after 16-hrs (metals)	Date/time of pH recheck	Rechecked by

\*(continue on back, if needed)

### FOLLOW-UP / COMMENTS